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**Wildland Urban Interface:
Bird Abundance and Diversity in the 2002 Field Season**

2002 Report to the Point Reyes National Seashore

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Introduction

During the summer of 2002, PRBO conducted songbird surveys in areas where fire fuel reduction treatments are slated to occur (i.e., fire defensible areas). These areas included Elk Range North, Elk Range South, Wittenberg, Bear Valley, Bolinas Ridge North, Highway One, and Palomarin. These surveys provide baseline data on songbird abundance and community composition against which potential changes due to fuel reduction treatments can be assessed. Additionally, PRBO conducted rapid surveys of areas where disturbance was proposed to occur during the songbird breeding season. This progress report summarizes work conducted in the summer of 2001 (rapid surveys only) and 2002.

Methods

Study Sites. All sites were selected within the Point Reyes National Seashore's Fire Management Areas. See Figure 1 for a map of survey locations.

Variable Circular Plot Censuses. We monitored birds at all sites using the variable circular plot (VCP) censusing method as recommended by National Park Service Inventory and Monitoring Program (Fancy and Sauer 2000). The detection of species during surveys may be a function of habitat type (e.g., vegetation differences), observer performance, environmental variables (e.g., wind, light levels), and physical and behavioral attributes of birds (Rosenstock et al. 2002). The advantage of the variable radius count is that it calculates a detection probability. Hence, differences in abundance attributed to habitat type or quality may actually reflect differences in detectability. Census transects consisted of 4 to 17 points spaced 200 to 250 meters apart. This method involves an observer standing at each point for 5 minutes and recording all birds seen or heard at distance intervals of 10, 20, 30, 40, 50, 75, 100, and >100 meters. All surveys were conducted between sunrise and three hours past sunrise to ensure the highest detection probability. The species presented in Appendix 3 are those that were detected at all ranges within a 50-meter radius. All points were marked using a Global Positioning System unit and were recorded in Universal Transverse Mercator NAD83 (Appendix II). Points were also described using physical landscape features (Appendix I). Each transect was censused twice during the breeding season (Table 1).

Table 1. List of VCP sites and survey dates. Transects marked with an asterisk were new in 2002. Fields marked with two asterisks were not censused in 2002 but recent enough data exists to warrant inclusion into future analyses. Tomales Point South, while representing a single transect, had to be censused in two parts due to weather difficulties.

Transect Name	Code	Site	Total Sites	Visit 1	Visit 2
Bear Valley*	BEAR	1-17	17	14-May-02	14-Jun-02
Bear Valley Meadow Trail	BVMT	55-65	11	13-May-02	28-May-02
Bolinas Ridge North*	BORN	1-16	16	11-May-02	28-May-02
Bolinas Ridge Trail**	BORT	1-25	25	-	-
Coast Trail	CTLA	17-29	13	13-May-02	24-May-02
Elk Range South*	ERSO	1-12	12	09-May-02	29-May-02
Estero*	ESTE	1-9	9	12-May-02	30-May-02
Lower Olema	LOOL	46-56	11	12-May-02	26-May-02
Mt. Wittenberg	MTWI	1-10	10	11-May-02	25-May-02
Palo Grid 5	PAG5	1-4	4	12-May-02	28-May-02

Transect Name	Code	Site	Total Sites	Visit 1	Visit 2
Palomarin	PALO	1-13	13	12-May-02	28-May-02
Tomales Point South	TOMS	1-10	10	11-May-02	-
Tomales Point South	TOMS	11-15	5	13-May-02	-
Tomales Point South	TOMS	12-15	4	-	25-May-02
Tomales Point South	TOMS	1-11	11	-	28-May-02

Area Search Censuses. Area searches were conducted on an on-call basis and were designed to assess each site on a single visit prior to treatment (Table 2). Because of this time constraint we didn't limit our area search censuses to the standard 20 minutes but took whatever time was needed to assess the entire site, which took anywhere from one to three hours. All area searches were conducted immediately after sunrise to maximize detection probability. Aside from duration and plot size differences, area search surveys followed the procedure outlined by Ralph et al. (1993). During these censuses we noted total number of species, individuals within each species, approximate location of individuals, and any indication of breeding activities (nests, material and food carries, pairs, and presence of fledglings).

Table 2. List of on-call (rapid-survey) sites and survey dates.

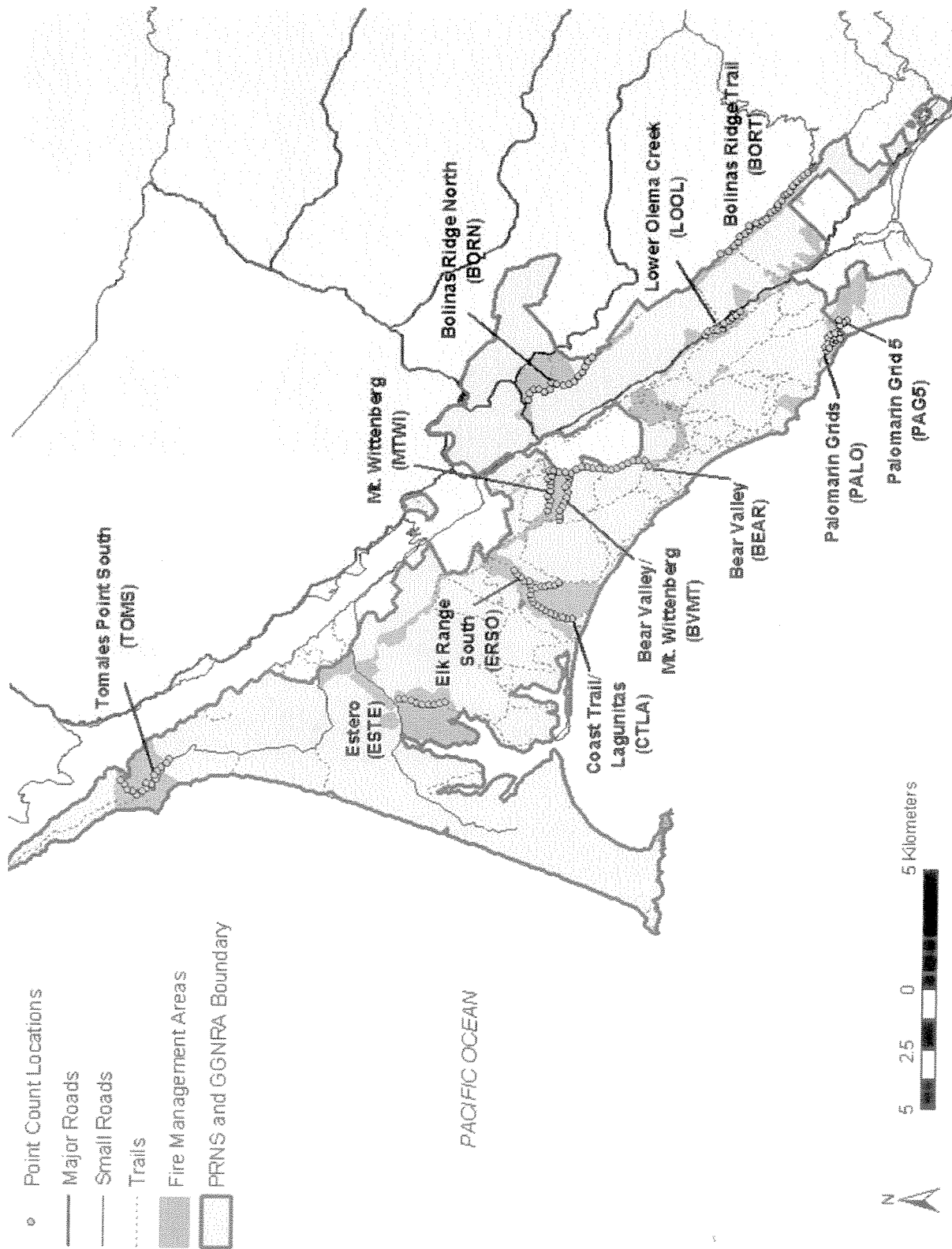
Location	Site	Visit Date
Beebe	-	12-July-02
Wilkins	1-1a	8-July-02
Wilkins	2	8-July-02
Wilkins	3-5a	8-July-02
Wilkins	4-5a	8-July-02
Wilkins	6-8	10-July-02
Panoramic Pines	-	9-May-02
Estero Trail XMas Tree	-	9-July-02
McDonald	1	12-July-02
McDonald	2	12-July-02
McCurdy	-	13-July-02

Vegetation Assessment. Vegetation and habitat characteristics were taken at each point using a relevé, which is a standard method outlined in Ralph et al. (1993). General habitat characteristics such as tree, shrub, and herb cover, height, and dbh were recorded. The vegetation was divided into three height classes and then species and cover of each species were recorded for each class. Relevés were conducted only at newly established transects (BEAR, BORN, ERSO, and ESTE). For all the other transects we utilized older data once we verified that the vegetation had not changed significantly since the last relevé.

Results

We conducted VCP censuses at 131 points within 11 transects and area searches at 11 sites within 6 locations. Appendix III gives a complete list of species detected within 50 meters at all survey locations. Appendix IV and Appendix V summarize the area search rapid-survey results for both 2001 and 2002.

Figure 1. Map of VCP transects and fire treatment layer



Literature Cited

- Fancy, S. G., and J. R. Sauer. 2000. Recommended methods for inventorying and monitoring landbirds in National Parks. National Park Service Inventory and Monitoring Program, 1201 Oak Ridge Dr., Suite 200, Fort Collins, CO 80525.
- Ralph, C.J., G.R. Geupel, P. Pyle, T.E. Martin, and D.F. DeSante. 1993. Field Methods for Monitoring Landbirds. USDA Forest Service Publication, PSW-GTR 144, Albany, CA.
- Rosenstock, S. S., D. R. Anderson, K. M. Giesen, T. Leukering, and M. F. Carter. 2002. Landbird counting techniques: current practices and an alternative. *Auk* 119:46-53.

Appendix I. Narratives for VCP transects

Bear Valley (BEAR)

All points in middle of Bear Valley Trail beginning at Bear Valley Visitor Center parking lot, PRNS. About 250m apart; 18 points total. Beginning at trailhead, heading south:

BEAR01: After trail enters forest, point is about 20 meters before the first curve in the trail, at wide spot in the trail. (2 young bays on left side.)

BEAR02: 250m further down trail. About 10m before 2 posts on either side of trail (culvert).

BEAR03: 250m further down trail. Where creek goes under trail.

BEAR04: 250m further down trail. Go under bay that leans horizontally 5m above the trail, partway up slight hill.

BEAR05: 250m further down trail. Trail becomes more open with lots of Douglas-firs. Pass close large Doug-fir, about 5m past fallen cut log that extends over the creek.

BEAR06: 250m further down trail. After trail curves left, pass under leaning bay, about 20m past BIG Doug-fir on trail, just before next bay leaning over the trail.

BEAR07: 250m further down trail. Two tallish snags on left, two short (6m tall) snags surrounded by lady fern on right.

BEAR08: 250m further down trail. Trail will start slightly uphill; pass small grassy area on the right (elderberries and nettles on left), point about 15m before trail curves right.

BEAR09: At Divide Meadow – past bathrooms, down hill, between posts on either side of trail and willow patch on right.

BEAR10: After meadow, go through a few alders. Point is about 20m past posts on either side (culvert), between beginning of sedge patch on left and beginning of Doug-firs on right.

BEAR11: 250m further down trail. 5m past 2 posts, under leaning alder and just past big stump on the left.

BEAR12: 250m further down trail and about 5m before big bay with broken branch resting in crook of trunk.

BEAR13: 250m further down trail. There is lots of sword fern close to trail on right and lots of cucumber hanging down to trail on the left. About 5m before culvert under trail and posts on either side.

BEAR14: 250m further down trail. About 5m past 2 posts. No good landmarks! Lots of tiny elderberries on left.

BEAR15: 250m further down trail. Lots of thimbleberry on right, point is at curve in trail, about 15m before HUGE log on right.

BEAR16: 250m further down trail. Where creek comes close to trail. Point is where creek is closest, big rocks in creek as riprap.

BEAR17: 250m further down trail. No good landmarks! Just after slight right curve, before it continues to curve right. Steep slope on right. Group of very young Doug-firs on left.

BEAR18: 250m further down trail. Where Baldy and Glen trails start – bike rack on right. Point in center of circle.

Bolinas Ridge North (BORN)

Take Hwy 1 to Olema, turn onto Sir Francis Drake and park at the trailhead at the top of the ridge. All points are 250 m. apart unless otherwise stated. All points are on the Bolinas Ridge trail.

BORN01: 290 m from the trailhead on Sir Francis Drake at the second gate on the trail.

BORN02: Perpendicular to $\frac{3}{4}$ of the way along bay patch on the left, and about 20 m. before small rock on the right.

BORN03: 50 m. past boulder to the right of the trail at the start of the juncos patch on the left.

BORN04: 4 m. before small rock on the right (4-5 m. from trail) and bay tree also on the right (50 m. from trail).

BORN05: Perpendicular to the trail from this point to the left there are two rocks 1-2 m away. One is about 30 cm long and the other 75 cm. long and sits behind the smaller one. A larger rock is about 40 m. behind these two.

BORN06: Next to scrub patch 4 m. past electrical pole on the only big Baccharis on the left edge of the trail.

BORN07: Perpendicular to this point on the left and 4-5 m. away is a 1 m. tall Baccharis. The point is also 1 m. past another Baccharis growing on the right edge of the trail. There are two clumps of Juncus on the right side of the trail about 10 and 30 m. ahead.

BORN08: This point is perpendicular to 3 wooden posts in the fence line (one after the other, looks like a support joint) and about 100 m. past the start of the fence line. There are small clusters of Baccharis on the left.

BORN09: 100 m. past gate along the fence on the right, 8 wooden posts past the poison oak covered post, and 16-17 posts before the next gate on the other side of the fence.

BORN10: 1 wooden post after the extra tall post and 40 m. past Baccharis clump straddling the fence.

BORN11: Go past gate along the fence line. The point is 20 m. before the metal gate on the other side of the fence. There should be 3 wooden posts plus 2 metal ones between you and this metal gate.

BORN12: At the Baccharis (1 m. tall) on the right and 50-60 m. before the tall post with a sign on it.

BORN13: 80 m. before gate and 11-12 metal posts after the tall post with a sign on it.

BORN14: Go through the gate to 250 m. past point 13. Point is next to the 3 m. tall oak (4 m. wide) growing on the left side of the trail.

BORN15: Perpendicular to the trail 3 m. past this point are an oak and a fir on the left and a sign along the fence on the right that says "US boundary NPS."

BORN16: Along the trail at the beginning of a patch of firs 50 m. to the right. The point is also 4 m. past the 4 m. tall fir 1.75 m. to the left of the trail and 4 m. before another 2 firs also on the left.

Bear Valley Meadow Trail (BVMT)

From Bear Valley Visitor Center in the Point Reyes National Seashore, park in the last dirt parking lot on the left at the far end of the lot, closest to the Bear Valley Trail head. Take the Bear Valley Trail head until you reach the intersection of Bear Valley Trail to Meadow Trail and Mt. Wittenberg Trail. Take the Bear Valley Trail to Meadow Trail. From there, take Meadow Trail up. Points are marked with red flagging unless otherwise noted.

BVMT55: Climb up for ~ 150 m to pc #55 (1st point). Red flag in small bay sprout from huge (100-150 cm dbh) bay tree, split into 2 trunks on right (N) side of trail.

BVMT56: According to GPS, #56 was closer than 200 m to pc #55. New red flag in small tanoak seedling on right (E) side of trail. Before clumps of huckleberry on either side.

BVMT57: Trail flattens out. Pass huge downed tree in more open area (still lots of bays, bracken & sword fern, but more open in canopy. ~ 5 m after downed tree, is pc #57. Red flag in branch of large bay tree.

BVMT58: New red flag in small huckleberry shrub on right (N) side, just after huge Douglas fir (200 cm dbh)

BVMT59: Red flag in small huckleberry shrub adjacent to large Douglas fir (50 – 60 cm dbh) on right (N/NE) side of trail. Right across from opening on left with lots of fallen branches & two huge (100- 150 cm dbh) Douglas firs.

BVMT60: Once come out into open meadow with Douglas fir forest on either side, continue up trail where more grass close to trail than ferns. When reach area ~10 m before area where bracken ferns are along trail, across from small Douglas fir with coyote bush behind it. NO FLAGGING

BVMT61: Just after enter forest from meadow (~15 m from opening) point is marked with red flag in tanoak tree (~15 cm dbh) on right (N) side of trail. Directly across from 2 Douglas firs with huckleberry growing in between.

BVMT62: path narrows, lots of huckleberry. Pt. on right (N) with red flagging in huckleberry next to sword fern & hazelnut.

BVMT63: More open area in canopy off left (S) side of trail. Red flag in small elderberry plant on right (N) side of trail next to Douglas fir with lots of dead lower branches, lots of sword ferns.

BVMT64: Closest reading on GPS was 20 m from point – Poor coverage. Red flag in small elderberry (~70 cm tall) in front of Douglas fir on right (N) side of trail.

BVMT65: Was NOT 200 m from point #64, so I moved it 50 m past original GPS pt. Marked it w/ red flag in small elderberry amongst bracken & sword ferns on right (N) side of trail. Across from 3 big trunks split off @ base of Douglas fir on left side of trail. Pt. is @ opening above (meadow) on right (N) side.

Coast Trail/Laguna (CTLA)

Points are approx. 200 meters apart, and are marked with red flagging unless otherwise noted. (#17-19: These points are in the riparian across from hostel, spaced 200 m. apart between parking lot and Coast Trailhead.)

CTLA17: This is 30 m. from the parking lot on the South edge. Access is through the nettles next to the parking lot.

CTLA18: In willow 30 m from the road just past the blackberry patch. Turn L from road at the writing on the pavement that says “#101 EL = 119.61”

CTLA19: About 25 m before the trail sign turn towards the riparian (following elk trails), cross the plank and pipe over the creek and go into the alder patch.

CTLA20: Along Coast Trail, at start of scrub. No flag.

CTLA21: In second meadow on L. To access you have to go almost to pt. 22 and turn back around the scrub and blackberry. No flag.

CTLA22: On alder at edge of swamp, end of meadow, L side of trail. To access go 50 m. beyond on the trail and turn left on the elk trails at the lupine clumps.

CTLA23: On alder about 10 m. before brown posts on L side of trail. There are 2 *Artemisias* at the opposite side of the trail.

CTLA24: On the trail at the brown posts & culvert before the snags on the ridge top on opposite side of trail. Flag in *Baccharis*.

CTLA25: At end of cattail swamp, on coyote bush on L side. Turn in at the brown posts & culvert 50 m past big alder on trail and turn back towards the end of the swamp.

CTLA26: 4 meters before culvert, at end of coffeeberry patch, flag under coyote bush along trail.

CTLA27: On small alder behind cattails on the R side, about 35 m. past bend in trail. Point is 6 m from the stream.

CTLA28: On small alder off trail 15 meters, at end of open alder stand, before willow/alder stand. There are various colors of flagging on trunk.

CTLA29: At last 100 meters of alder 7 m past 3 willows (1 big, 1 med, 1 small) on the L. Point is on the R side about 10 m. from the trail and there are various colors of flagging on the tree trunk.

Elk Range South (ERSO)

Take the road to Limantour Beach and turn left towards the youth hostel at the Muddy Hollow intersection. Park in the lot just past the hostel on the right. Points 1-6 are on the E portion of the Laguna trail going towards and past the Environmental Education Center. All points are 200 m. apart along the trail.

ERSO01: 7 m. before foot bridge and exactly 200 m. from CTLA17, which is part of the Coast Trail transect. Stand next to the CA blackberry on the L side of trail. There are some cut logs directly across trail on the R.

ERSO02: Just past Clem Miller Environmental Education Center in the field. Go past thick patch of blackberry on the R just before a patch of willows that is 8-10 m. from the trail.

ERSO03: Come up onto the ridge. To the L of where the path curves there's a stand of 9-10 charred ½ live snags and an arrow sign. Go 40 m. beyond past a small drainage that crosses the trail to where ceanothus grows on both sides. Stand next to the Ceanothus on the R, which has a 3 m. snag coming up from behind it.

ERSO04: Point is under the branches of a 15 m. fir that hangs over the trail (tree is 3 m. on the L side). This is just past a long line of ½ burned tall firs flanking the trail on the R and a small drainage that crosses the path.

ERSO05: Where pines flank trail on the L you'll see a big stand of live firs 40-50 m. to the R. Point is where a small drainage meets the trail and leads to nowhere into a clearing on the R side.

ERSO06: Young pines grow thickly on either side of the trail. Go past a gap on the R with a saw cut log perpendicular to the trail. Point is where pines suddenly end on the R and it opens into scrub (big coyote bush after the last pine). On the L you'll see a burned 12 m. snag with branches curving down in various directions, gesticulating at you.

Points 7-12 are on the W portion of the Laguna Trail going towards the ocean. All of them save for 12 are to the R of the trail in the scrub (lots of poison oak!). ERSO A-E mark where you turn in from the trail and correspond to points 7-11.

ERSO07: Turn R 130 m. past Laguna Trail sign at the small alders on either side (ERSOA 0512522 4210473). Go perpendicular to the trail up the small drainage keeping to the L of the dead trees. Point is 75 m. from trail on a 2.5 m. snag at the base of the Ceanothus 15 m. past the dead trees.

ERSO08: Go back to trail and turn R into scrub 220 m. from ERSOA (ERSOB 0512568 4210256) where 2 4 m. snags stand 6 m. apart on the L of the trail. Point is 70 m. up to the R of the big clump of Ceanothus on the only twinberry shrub, which is about 10 m. from a ½ dead bay laurel.

ERSO09: 190 m. up trail from ERSOB (ERSOC 0512607 4210072) where a small drainage crosses the path. Point is 80 m. up on a 2.5 m. bay laurel beneath and slightly to the R of a three-pronged snag on the ridge top.

ERSO10: 200 m up trail (at ERSOD 0512624 4209874) at the big narrow boulder on the R. Walk towards the R side of the boulder to the rock's edge before the ground gets steep. Point is on a *Baccharis* at the tip of the rock.

ERSO11: 200 m. up trail from ERSOD (ERSOE 0512629 4209675) to the *Ceanothus* on the L (10 m. from trail). On the right is a single *Ceanothus* 6 m. from trail. Turn right through scrub past old fence post down to drainage. Point is on a 2 m. tall live oak 8 m. above the buckeye that is at the bottom of the drainage and 3 m. from a big group of *Ceanothus*.

ERSO12: This point is on the trail 200 m. past ERSOE and 50 m. *before* the Fire trail sign on a *Baccharis*. If you look to the L of the point you'll see a 1 m. *Baccharis* 3 m. from the trail with a stick coming out of the top.

Estero (ESTE)

Take Sir Francis Drake to Estero Rd. Park at the cattle pond. All points are on the road and eventually on the Estero Trail.

ESTE01: Point at end of cattle pond.

ESTE02: Point at road fork.

ESTE03: Point at telephone pole adjacent to the large Eucalyptus *before* cattle guard.

ESTE04: Point is 2.5 telephone poles from point 3.

ESTE05: Point at the telephone pole with yellow plastic cover over support cable.

ESTE06: Point at Estero trailhead info sign.

ESTE07: Take Estero trail until very large blackberry clump on right side of trail.

ESTE08: Point where scrub begins to surround trail.

ESTE09: Where trail first affords open view of Pines.

Lower Olema (LOOL)

Points are approximately 200 meters apart. Degrees are relative to magnetic, not true, north.

LOOL46: Across from first eucalyptus tree to the northerly end of white "bat house" on Hwy. 1, at willow edge across street.

LOOL47: Walk south along riparian corridor. Point in line with 4th telephone pole after bat house at willow edge right after "turn out" sign.

LOOL48: Walk south along riparian corridor, point directly in line with last oak in line with oaks along road.

LOOL49: Walk 150 meters, through grassy area along willows, then cross the creek at flagging. Crossing is in line with willow patch, which is next to a mound just beyond tiny patch of [rushes?] near willows. Point is 240° at 17 meters from lone Douglas fir. Point is across a grassy patch from the fir, to willow edge.

LOOL50: Walk 200 m. From #49 point is at end of U shaped corridor, 220° 25 m. from low flat coyote bush on mound. Point is along willow edge, about 10 meters off the trail.

LOOL51: Walk along trail toward highway – point is 150° 25 m. from willow/blackberry patch, right along trail, and is also about 25 meters before the only low willow just to the left of the trail.

LOOL52: Cross creek just before lone Douglas fir (if impassable, go out to road to cross and then head back in). Crossing spot is marked w/blue flagging. Point is 20m before barbed wire fence that is alongside driveway. There are no trees between the point on the willow and the highway.

LOOL53: Follow the edge of the willows and eucalyptus grove (you'll cross a fence). The point is at end of first eucalyptus grove, tag is on willow 11 m. before second grove.

LOOL54: Cross creek at alder grove that you see from pt #53. Follow trail on the other side of the creek. Point is 7 m. at 374° from bay tree, which is approx. 5m tall.

LOOL55: Point is 62°, 3m. from oak tree. Tag on alder.

LOOL56: Walk past treeless part of creek, point at beginning of last large willow patch. (Pass smaller willows and coyote bush). Point is on other (south) side of creek and fence from the road. Corresponds approximately to mile marker 19.87, and also to sign with Horse & Rider Crossing symbol (can park here).

Mount Wittenberg (MTWI)

From Bear Valley Visitor Center in the Point Reyes National Seashore, park in the last dirt parking lot on the left at the far end of the lot, closest to the Bear Valley Trail head. Take the Bear Valley Trail head until you reach the intersection of Bear Valley Trail to Meadow Trail and Mt. Wittenberg Trail. Take the Mt. Wittenberg Trail.

MTWI01: From the Bear Valley Trail/Mt. Wittenberg junction, go ~ 100 m from open meadow. Red flagging in small Bay seedling on right side of trail (N). Just before 2 large (100 cm dbh) Doug Firs on right side of trail.

MTWI02: Just beyond (W) of where 2 small bay trees are crossing the trail at left (S) side of the trail. Large Doug Fir to right (N) side of trail. Red flagging in small tanoak seedling with Hazelnut growing directly in front of it and sword fern below. *Old orange flag in tanoak also.

MTWI03: Red flagging in bay tree that's been cut off about 3 m up – has lots of sprouts/branches growing out of the base. Old orange flag in bay also. Bay on right (E) side of trail. Group of rocks in trail just before bay w/flagging. Lots of sword ferns and large bay (~40cm dbh) with large part of trunk split off on the left (SW) side of trail.

MTWI04: Old orange flag & new red flagging in small huckleberry on left side (E facing slope) just before round sharp curve going to right (SW). Just before small (20 cm dbh) tanoak and about 10 m before huge Douglas fir with lots of broken branches & knobs.

MTWI05: ~ 20 m before reach opening in forest to go out into more open meadow/Douglas firs. Old orange flag & new red flagging in huckleberry on left (S) side of trail.

MTWI06: After pass through open meadow with some Douglas firs – huge old coast/interior live oak on left (S) side of trail. Has remnants of old orange flagging & new red flag in first lower branches you come to. ~30 – 40 m before head into Douglas firs again.

MTWI07: After go through small patch of Douglas firs following point 6, will come to more open grassy/chaparral again. Beyond chaparral, just @ edge of Douglas fir forest, old orange & new red flag in low branches of 1st large Douglas fir you come to.

MTWI08: Did NOT find old orange flagging, but used GPS to find point. Start heading out of 3rd more open meadow area & climb back up into Douglas firs. At boundary between these 2 habitats, small Douglas fir (30 cm dbh) on left (S) side of trail with lots of dead branches. Placed red flagging here.

MTWI09: Once you've entered Douglas fir forest, you continue to climb & go on 3-4 switchbacks. At sharp corner veering right (N/NE), small Douglas fir on right (N) side of trail. Red flagging in it (did NOT find old orange flag). Also small path heading off sharp turn in opposite direction to left (S).

MTWI10: Did NOT find old orange flag. Trail starts to flatten out after steep climb past where trail splits with Douglas fir in middle (after pc #9). Once in Douglas fir forest again, trail flattens out.

Red flag in small (~20 cm dbh) bay on left side (S) of trail. Bay has tons of sprouts growing out from base of main trunk.

Palo Grid 5 (PAG5)

Need accompanied map for this to make sense!

PAG501: At sagebrush that is midway between fir tree and box along trail.

PAG502: Walk “right” (south-ish). Point is in middle of marsh.

PAG503: Walk along contour of hill from point 1. Or straight away from road from point 2. See willows upslope from marsh (point 2), head towards them. Point is at edge of willows in “valley”, is flagged.

PAG504: Head back to road and continue south (towards Bolinas). Cross beneath willows through cow trails. Take the 2nd trail (higher one) of the 2 main cow trails. Point is just before eroded area, when looking straight out to road it is ½ way between telephone pole to south and telephone pole by fence (which is 2 telephone poles left – south – of Coast Guard Station.)

Palomarin (PALO)

Palomarin Coast Trail trailhead. Point count is in eucalyptus grove, 20 meters past Palomarin Trailhead map and coastal trail mileage sign. Point count is in middle of grove. Coastal Scrub points (flagged with orange):

PALO01: Where coastal path meets the edge of cliff, just before right hand bend. Walk 60 meters inland around right-hand side of small “hill” with rock face. Point is 30 meters off to right, flagged in scrub.

PALO02: Continue on path as it goes away from cliff edge. Point is below 3 large conifers on right hand hillside as switchback bend straightens out.

PALO03: Follow path past fencing on cliff edge, past 2 eucalyptus trees on coast side, to where small mound rises between cliff edge and path. On right hand side is bare hill face, walk up this to point, 40 meters from path.

PALO04: Follow path to before the point where path comes to cliff edge. A drainage channel cuts across path also. Point is inland up small hill at a fence post in scrub.

PALO05: Follow coast path around right-hand bend, as it goes inland above a ravine where path is on the very edge of ravine. Just before a right-hand bend is the point, flagged on tree above path.

PALO06: Follow path into ravine, over bridge, and back towards coast. Just before right-hand bend there is a drainage channel across path. Point is on right bend overlooking the area where 2 ravines converge.

PALO07: Follow path to sharp right bend 70 meters further on. Take minor trail off to the left towards coast. Follow minor trail to approximately 60 meters from cliff edge. Point is on large bush off to left.

PALO08: Walk back to main path, and then go up hillside to your left where 6 or 7 small conifers are growing. Point is at right most conifer (inland most tree).

PALO09: Go back to main path, continue along this until you go under small group of conifers. Point is just beyond conifers, flagged on hillside to the right.

PALO10: Continue on main path through left, right, and left-hand bends. Then, just before another left hand bend, take minor short cut trail off to right. Point is flagged 40 meters down this trail, downhill off to left.

PALO11: Return to main trail. Walk to where path enters cutting between two hills either side of trail. Point is just short of the start of the cutting as the path straightens out from left-hand bend.
PALO12: Continue on path through cutting. Point is where path reaches peak and starts to descend.
PALO13: Go directly left off trail, up hillside. Walk towards largest conifer directly in front of you. Continue past this, reach top of hill in front of you. Point is flagged in small conifer in front and left of you from hill top (about 11 o'clock).

Tomales Point South (TOMS)

Points are 250 meters apart. Degrees are relative to magnetic, not true, north.

TOMS01: 50 meters, 32° from cattle guard at entry to Elk Preserve (near "collecting of elk antlers is prohibited" sign). Point is by a fairly tall coyote bush ~40m straight out from fence.

TOMS02: Head along road further into preserve. Point is ~30 meters NW of "cattle guard" sign (the one after the cattle guard when heading to Tomales Point), next to lichen-covered coyote bush stub just downhill from road, at furthest (NW) end of gravel/grassy pullout. Also 246° to telephone pole.

TOMS03: Walk along road and cross at flagged coyote bush next to tiny rock outcrop which is ~50m further up road from mile marker 7.93 - head 85 meters at 302° into grass. Point next to thistle patch at flagged large patch of coyote bush.

TOMS04: Continue at 302°, 250 meters over hillock, coyote bush is marked with orange flag, near vegetation enclosure. Spot is almost the top tier of coyote bush patches and is a thick patch. Is directly in line with island; can see two telephone poles uphill. Stand at flat bald above coyote bush patch, up from flagged shrub.

TOMS05: Continue at 302° for 250 meters, heading straight for the farmhouse, and ending up ~50 meters down into gully along elk path. Point is 182°, 35-40 meters from the rocky knob. Walk along elk path to reach point. Point is about 2° from furthest e. telephone pole.

TOMS06: Head up out of gully towards phone pole that is due south of point 5 and the furthest east pole in view; continue past pole on a bearing of 260°. Point is about 20 meters before road at a lone coyote bush immediately adjacent to a mostly dead coyote bush to its east.

TOMS07: Continue 250 meters at 302°, point is 50 meters before hillock, overlooking Pierce Ranch. Point is in line with a big patch of salmonberry to south and the furthest east telephone pole on the other side. Flagging is on a shrub snag surrounded by irises 48° ~20m from crest of salmonberry hill.

TOMS08: Continue 250 meters at 356°, 40 meters from road, at hairpin curve. Point is 108°, about 70 meters from McClures Beach sign; flagging is on snag in a grassy patch amidst lupine and mustard, just upslope.

TOMS09: Continue 250 meters. Site on the sand pit across the road at 232° from the McClures Beach sign. Point is uphill from this small sandpit about 30 meters; flagging is on lupine, 5m, 144° of lone large coyote bush.

TOMS10: Continue 250 meters at 302°, crossing the road at edge of willow draw by the "Dogs and Camping Prohibited" sign. Point is just over 50 meters at 308° from the edge of the willow draw at large coyote bush where hillside begins to level out.

TOMS11: Continue 250 meters at 302°, cross trail and gully - point is halfway up grassy slope to trail on other side of gully, at a large coyote bush patch; about 15 meters from the willows (SW of N end

of willows). An easier walk (when thistle has grown) is to head north to main trail, and walk trail till it curves left and goes over draw; after crossing draw there is a 6ft. tall coyote bush just to the left of the trail – the point is on a coyote bush 197° from this one.

TOMS12: Continue 250 meters at 21°. Head toward vegetation enclosure fence, walk along north side of enclosure and continue at same bearing. Point is at edge of grassy area and thick coyote bush patch, about 60 m, 13° from the east end of the vegetation enclosure.

TOMS13: Head N up on elk path, continue on elk paths roughly 21°, then continue ~60° down elk path; end up just set back from overlooking salmonberry draw, facing west you'll see a white rock pit with the inlet to the right. Do not cross main gully. 170° from white sand patch (more inland one), 87° from rocky knoll atop draw, 314° from triangle that is a rooftop. In somewhat open area. GPS probably helpful on 1st visit.

TOMS14: Continue 250 meters at approx 30°, point is 50 meters before marshy spot. Go down to the marsh/rushes draw but do not cross it. Do point at blackberry patch directly across marsh draw from flagged coyote bush (may not be flagged anymore), which is 172° straight downhill from e. vegetation enclosure. Point is right along elk path.

TOMS15: Head out 37° - cross draw and continue, point is near next drainage (NE) on coyote bush - site on the end of willow patch where it meets marsh. Point is 198° from the willow edge closest to inlet in the next draw; point is in huge coyote bush. If starting with point 15, you can see the mentioned inlet and draw from Windy Gap, and can drop down from there.

Appendix II. GPS coordinates for each point in UTM NAD83

Code	Site	X Coordinate	Y Coordinate	Code	Site	X Coordinate	Y Coordinate
BEAR	1	517318.38287	4209743.44463	ERSO	1	512588.88852	4210652.70628
BEAR	2	517239.78574	4209511.15012	ERSO	2	512762.89331	4210752.37502
BEAR	3	517249.24884	4209265.35988	ERSO	3	512768.70400	4210949.39522
BEAR	4	517216.34255	4209017.69499	ERSO	4	512919.11815	4211079.38565
BEAR	5	517362.26931	4208809.09268	ERSO	5	513034.64930	4211239.67837
BEAR	6	517469.63380	4208581.37226	ERSO	6	513200.60304	4211358.98528
BEAR	7	517509.24240	4208337.42159	ERSO	7	512452.69521	4210448.93902
BEAR	8	517413.68213	4208107.48659	ERSO	8	512499.63432	4210228.19187
BEAR	9	517411.39331	4207855.71422	ERSO	9	512529.09638	4210047.89169
BEAR	10	517411.93085	4207603.95900	ERSO	10	512571.22776	4209894.99040
BEAR	11	517383.26367	4207355.70390	ERSO	11	512570.63376	4209669.40907
BEAR	12	517399.81261	4207103.98256	ERSO	12	512668.84294	4209482.07344
BEAR	13	517522.71973	4206885.21624	ESTE	1	507742.00000	4216082.99820
BEAR	14	517664.44515	4206679.58402	ESTE	2	507735.00000	4215853.99820
BEAR	15	517753.48810	4206447.65682	ESTE	3	507661.00000	4215589.99819
BEAR	16	517751.21376	4206197.67120	ESTE	4	507580.00000	4215359.99819
BEAR	17	517766.83304	4205943.56348	ESTE	5	507521.00000	4215128.99819
BEAR	18	517554.26700	4205793.71583	ESTE	6	507529.00000	4214848.99819
BVMT	55	517167.09151	4209139.45125	ESTE	7	507534.00000	4214621.99819
BVMT	56	517054.85131	4209093.72511	ESTE	8	507593.00000	4214389.99819
BVMT	57	516869.50066	4209176.55487	ESTE	9	507638.00000	4214170.99819
BVMT	58	516713.99239	4209259.44989	LOOL	46	523160.69001	4203496.49727
BVMT	59	516538.63980	4209175.87773	LOOL	47	523314.06001	4203374.49727
BVMT	60	516312.14196	4209212.03648	LOOL	48	523351.00001	4203161.49727
BVMT	61	516074.93131	4209341.38112	LOOL	49	523362.53001	4202970.49727
BVMT	62	515906.32456	4209396.52739	LOOL	50	523397.94001	4202755.49727
BVMT	63	515734.10281	4209507.14679	LOOL	51	523583.50001	4202737.99727
BVMT	64	515491.89310	4209505.57388	LOOL	52	523676.38001	4202661.49727
BVMT	65	515343.58848	4209501.96511	LOOL	53	523747.94001	4202473.99727
BORN	1	520404.03701	4210835.16628	LOOL	54	523900.81001	4202331.99727
BORN	2	520644.26592	4210766.72721	LOOL	55	524003.72001	4202157.49727
BORN	3	520839.05817	4210613.06486	LOOL	56	524173.19001	4202024.99727
BORN	4	520847.22522	4210364.29107	MTWI	1	517388.00001	4209922.99728
BORN	5	520721.62958	4210144.34134	MTWI	2	517213.00001	4209844.99728
BORN	6	520858.67661	4209935.77461	MTWI	3	517067.00001	4209989.99728
BORN	7	521101.22494	4209892.35325	MTWI	4	516972.00001	4209890.99728
BORN	8	521089.64074	4209638.76719	MTWI	5	516772.00001	4209889.99728
BORN	9	521022.46405	4209400.51301	MTWI	6	516553.00001	4209900.99728
BORN	10	521072.99499	4209157.20582	MTWI	7	516361.00001	4210004.99728
BORN	11	521171.52478	4208924.14179	MTWI	8	516181.00001	4209902.99728
BORN	12	521375.77141	4208776.46895	MTWI	9	515923.00001	4209916.99728
BORN	13	521573.92991	4208619.26196	MTWI	10	515716.00001	4210011.99728
BORN	14	521775.38235	4208465.63960	PAG5	1	523572.08741	4197851.24399

Appendix II

Code	Site	X Coordinate	Y Coordinate	Code	Site	X Coordinate	Y Coordinate
BORN	15	521993.22879	4208346.58810	PAG5	2	523687.70568	4197693.93699
BORN	16	522213.44878	4208222.78727	PAG5	3	523818.79057	4197898.40208
BORT	1	529986.70001	4199242.14727	PAG5	4	523835.66833	4197573.79470
BORT	2	529865.93001	4199429.56727	PALO	1	523275.39785	4198086.45109
BORT	3	529771.60001	4199569.53727	PALO	2	523099.87530	4198044.46374
BORT	4	529626.92001	4199729.06727	PALO	3	523210.64136	4197924.65444
BORT	5	529428.71001	4199895.05727	PALO	4	523049.57958	4197878.98573
BORT	6	529207.14001	4199977.72727	PALO	5	522958.42140	4197997.99719
BORT	7	529098.57001	4200078.72727	PALO	6	522840.80219	4198153.48037
BORT	8	529051.77001	4200220.35727	PALO	7	522625.96749	4198294.49744
BORT	9	528812.12001	4200336.67727	PALO	8	522547.50037	4198443.47237
BORT	10	528675.24001	4200508.28727	PALO	9	522715.53595	4198473.00442
BORT	11	528530.91001	4200505.11727	PALO	10	522798.71388	4198334.97379
BORT	12	528408.53001	4200606.42727	PALO	11	523014.62384	4198201.49652
BORT	13	528305.44001	4200769.39727	PALO	12	523184.83712	4198253.38248
BORT	14	528058.42001	4200941.18727	PALO	13	523095.02585	4198366.52522
BORT	15	527915.11001	4201101.72727	TOMS	1	505166.25619	4225602.96833
BORT	16	527796.26001	4201247.10727	TOMS	2	504992.06599	4225735.17381
BORT	17	527883.58001	4201409.03727	TOMS	3	504806.05926	4225968.73394
BORT	18	527746.06001	4201655.10727	TOMS	4	504643.34838	4226113.60270
BORT	19	527575.23001	4201673.05727	TOMS	5	504482.00375	4226268.90533
BORT	20	527410.06001	4201831.55727	TOMS	6	504295.82897	4226159.30258
BORT	21	527288.40001	4202072.74727	TOMS	7	504094.81426	4226360.08381
BORT	22	527088.10001	4202136.76727	TOMS	8	504155.32491	4226574.07032
BORT	23	526894.84001	4202274.81727	TOMS	9	503898.52064	4226561.56025
BORT	24	526696.36001	4202533.13727	TOMS	10	503823.95346	4226761.64442
BORT	25	526573.40001	4202853.27727	TOMS	11	503658.87241	4226954.62013
CTLA	17	512386.63001	4210636.49728	TOMS	12	503782.93504	4227155.66223
CTLA	18	512202.41001	4210664.49728	TOMS	13	503877.77018	4227340.01562
CTLA	19	511999.03001	4210625.99728	TOMS	14	504100.58316	4227491.23587
CTLA	20	511833.88001	4210564.99728	TOMS	15	504251.99705	4227628.12235
CTLA	21	511759.19001	4210375.49728				
CTLA	22	511643.34001	4210213.99728				
CTLA	23	511517.91001	4210030.49728				
CTLA	24	511387.94001	4209835.49728				
CTLA	25	511325.63001	4209640.49728				
CTLA	26	511229.41001	4209495.49728				
CTLA	27	511242.81001	4209326.49728				
CTLA	28	511172.41001	4209139.49728				
CTLA	29	511146.53001	4208945.99728				

Appendix III. Species list, richness, and diversity by transect within a 50 m. radius

Station	Species Code	Species Name	Count	Total Individuals	SW	Species Richness
BEAR	ACWO	Acorn Woodpecker	3	382	16.23	35
	ALHU	Allen's Hummingbird	6	-	-	-
	AMGO	American Goldfinch	7	-	-	-
	AMRO	American Robin	3	-	-	-
	ANHU	Anna's Hummingbird	1	-	-	-
	BHCO	Brown-headed Cowbird	2	-	-	-
	BHGR	Black-headed Grosbeak	6	-	-	-
	BRBL	Brewer's Blackbird	5	-	-	-
	BRCR	Brown Creeper	8	-	-	-
	BTPI	Band-tailed Pigeon	1	-	-	-
	BUSH	Bushtit	2	-	-	-
	CALT	California Towhee	1	-	-	-
	CAQU	California Quail	5	-	-	-
	CBCH	Chestnut-backed Chickadee	22	-	-	-
	CORA	Common Raven	1	-	-	-
	DOWO	Downy Woodpecker	2	-	-	-
	EUST	European Starling	2	-	-	-
	HAWO	Hairy Woodpecker	5	-	-	-
	HEWA	Hermit Warbler	2	-	-	-
	HUVI	Hutton's Vireo	4	-	-	-
	MODO	Mourning Dove	4	-	-	-
	NOFL	Northern Flicker	1	-	-	-
	OATI	Oak Titmouse	1	-	-	-
	OCWA	Orange-crowned Warbler	4	-	-	-
	ORJU	Oregon Junco	2	-	-	-
	PSFL	Pacific-slope Flycatcher	32	-	-	-
	PUFI	Purple Finch	6	-	-	-
	RWBL	Red-winged Blackbird	15	-	-	-
	SOSP	Song Sparrow	61	-	-	-
	SPTO	Spotted Towhee	1	-	-	-
	STJA	Steller's Jay	7	-	-	-
	SWTH	Swainson's Thrush	62	-	-	-
	WAVI	Warbling Vireo	20	-	-	-
	WIWA	Wilson's Warbler	49	-	-	-
	WIWR	Winter Wren	29	-	-	-
BORN	ALHU	Allen's Hummingbird	2	81	13.99	20
	AMGO	American Goldfinch	14	-	-	-
	BEWR	Bewick's Wren	2	-	-	-
	BUSH	Bushtit	2	-	-	-
	CALT	California Towhee	4	-	-	-
	CAQU	California Quail	17	-	-	-
	CBCH	Chestnut-backed Chickadee	5	-	-	-
	CHSP	Chipping Sparrow	4	-	-	-

Appendix IV

Station	Species Code	Species Name	Count	Total Individuals	SW	Species Richness
	GRSP	Grasshopper Sparrow	4	-	-	-
	HOLA	Horned Lark	1	-	-	-
	LAZB	Lazuli Bunting	1	-	-	-
	ORJU	Oregon Junco	1	-	-	-
	PISI	Pine Siskin	2	-	-	-
	PSFL	Pacific-slope Flycatcher	2	-	-	-
	PUFI	Purple Finch	2	-	-	-
	SAVS	Savannah Sparrow	5	-	-	-
	SOSP	Song Sparrow	3	-	-	-
	SPTO	Spotted Towhee	3	-	-	-
	WEBL	Western Bluebird	2	-	-	-
	WREN	Wrentit	5	-	-	-
BVMT	ALHU	Allen's Hummingbird	1	160	15.08	25
	AMRO	American Robin	1	-	-	-
	ANHU	Anna's Hummingbird	2	-	-	-
	BHGR	Black-headed Grosbeak	1	-	-	-
	BRCR	Brown Creeper	9	-	-	-
	CBCH	Chestnut-backed Chickadee	19	-	-	-
	EUST	European Starling	1	-	-	-
	GCKI	Golden-crowned Kinglet	5	-	-	-
	HAWO	Hairy Woodpecker	1	-	-	-
	HETH	Hermit Thrush	1	-	-	-
	MODO	Mourning Dove	1	-	-	-
	ORJU	Oregon Junco	11	-	-	-
	PISI	Pine Siskin	3	-	-	-
	PSFL	Pacific-slope Flycatcher	20	-	-	-
	PUFI	Purple Finch	3	-	-	-
	PYNU	Pygmy Nuthatch	2	-	-	-
	RBNU	Red-breasted Nuthatch	1	-	-	-
	SOSP	Song Sparrow	8	-	-	-
	SPTO	Spotted Towhee	5	-	-	-
	STJA	Steller's Jay	4	-	-	-
	SWTH	Swainson's Thrush	15	-	-	-
	WAVI	Warbling Vireo	7	-	-	-
	WIWA	Wilson's Warbler	26	-	-	-
	WIWR	Winter Wren	12	-	-	-
	WREN	Wrentit	1	-	-	-
CTLA	ALHU	Allen's Hummingbird	5	184	13.39	24
	AMGO	American Goldfinch	4	-	-	-
	AMRO	American Robin	6	-	-	-
	ANHU	Anna's Hummingbird	3	-	-	-
	BEWR	Bewick's Wren	6	-	-	-
	BHCO	Brown-headed Cowbird	4	-	-	-
	BHGR	Black-headed Grosbeak	6	-	-	-
	BRBL	Brewer's Blackbird	2	-	-	-

Appendix IV

Station	Species Code	Species Name	Count	Total Individuals	SW	Species Richness
	CAQU	California Quail	1	-	-	-
	CBCH	Chestnut-backed Chickadee	12	-	-	-
	COYE	Common Yellowthroat	13	-	-	-
	HOWR	House Wren	1	-	-	-
	PSFL	Pacific-slope Flycatcher	4	-	-	-
	RSFL	Red-shafted Flicker	5	-	-	-
	SOSP	Song Sparrow	43	-	-	-
	SPTO	Spotted Towhee	7	-	-	-
	STJA	Steller's Jay	1	-	-	-
	SWTH	Swainson's Thrush	31	-	-	-
	TRES	Tree Swallow	3	-	-	-
	WAVI	Warbling Vireo	5	-	-	-
	WEBL	Western Bluebird	1	-	-	-
	WEWP	Western Wood-pewee	1	-	-	-
	WIWA	Wilson's Warbler	19	-	-	-
	WIWR	Winter Wren	1	-	-	-
ERSO	ALHU	Allen's Hummingbird	7	130	14.44	25
	AMGO	American Goldfinch	4	-	-	-
	ANHU	Anna's Hummingbird	4	-	-	-
	BEWR	Bewick's Wren	6	-	-	-
	BHCO	Brown-headed Cowbird	1	-	-	-
	BHGR	Black-headed Grosbeak	3	-	-	-
	BTPI	Band-tailed Pigeon	1	-	-	-
	BUSH	Bushtit	4	-	-	-
	CALT	California Towhee	1	-	-	-
	CBCH	Chestnut-backed Chickadee	9	-	-	-
	COYE	Common Yellowthroat	1	-	-	-
	DOWO	Downy Woodpecker	2	-	-	-
	HUVI	Hutton's Vireo	1	-	-	-
		Nuttall's White-crown Sparrow	1	-	-	-
	NWCS		1	-	-	-
	OCWA	Orange-crowned Warbler	1	-	-	-
	OSFL	Olive-sided Flycatcher	1	-	-	-
	PSFL	Pacific-slope Flycatcher	1	-	-	-
	RSFL	Red-shafted Flicker	3	-	-	-
	SOSP	Song Sparrow	27	-	-	-
	SPTO	Spotted Towhee	19	-	-	-
	SWTH	Swainson's Thrush	10	-	-	-
	WAVI	Warbling Vireo	2	-	-	-
	WESJ	Western Scrub Jay	1	-	-	-
	WIWA	Wilson's Warbler	14	-	-	-
	WREN	Wrentit	6	-	-	-
ESTE	AMGO	American Goldfinch	22	88	7.01	12
	BHCO	Brown-headed Cowbird	1	-	-	-
	CAQU	California Quail	11	-	-	-
	COYE	Common Yellowthroat	1	-	-	-

Appendix IV

Station	Species Code	Species Name	Count	Total Individuals	SW	Species Richness
	HOFI	House Finch	5	-	-	-
		Nuttall's White-crown				
	NWCS	Sparrow	19	-	-	-
	PUFI	Purple Finch	1	-	-	-
	SAVS	Savannah Sparrow	4	-	-	-
	SOSP	Song Sparrow	19	-	-	-
	SPTO	Spotted Towhee	2	-	-	-
	WEBL	Western Bluebird	1	-	-	-
	WREN	Wrentit	2	-	-	-
LOOL	ALHU	Allen's Hummingbird	17	154	11.1	22
	ANHU	Anna's Hummingbird	1	-	-	-
	ATFL	Ash-throated Flycatcher	1	-	-	-
	BEWR	Bewick's Wren	1	-	-	-
	BHCO	Brown-headed Cowbird	2	-	-	-
	BHGR	Black-headed Grosbeak	3	-	-	-
	BRBL	Brewer's Blackbird	1	-	-	-
	BUSH	Bushtit	7	-	-	-
	CBCH	Chestnut-backed Chickadee	23	-	-	-
	COYE	Common Yellowthroat	2	-	-	-
	HOWR	House Wren	2	-	-	-
	MODO	Mourning Dove	1	-	-	-
	OCWA	Orange-crowned Warbler	1	-	-	-
	PSFL	Pacific-slope Flycatcher	4	-	-	-
	PUFI	Purple Finch	4	-	-	-
	SOSP	Song Sparrow	30	-	-	-
	STJA	Steller's Jay	1	-	-	-
	SWTH	Swainson's Thrush	15	-	-	-
	WESJ	Western Scrub Jay	3	-	-	-
	WIWA	Wilson's Warbler	30	-	-	-
	WREN	Wrentit	3	-	-	-
	YWAR	Yellow Warbler	2	-	-	-
MTWI	ACWO	Acorn Woodpecker	5	178	19.33	30
	ALHU	Allen's Hummingbird	2	-	-	-
	AMRO	American Robin	4	-	-	-
	ANHU	Anna's Hummingbird	1	-	-	-
	BRCR	Brown Creeper	4	-	-	-
	BUSH	Bushtit	1	-	-	-
	CALT	California Towhee	2	-	-	-
	CAQU	California Quail	5	-	-	-
	CBCH	Chestnut-backed Chickadee	17	-	-	-
	EUST	European Starling	2	-	-	-
	GCKI	Golden-crowned Kinglet	3	-	-	-
	HAWO	Hairy Woodpecker	4	-	-	-
	HUVI	Hutton's Vireo	1	-	-	-
	MODO	Mourning Dove	1	-	-	-
	OCWA	Orange-crowned Warbler	1	-	-	-

Appendix IV

Station	Species Code	Species Name	Count	Total Individuals	SW	Species Richness
	ORJU	Oregon Junco	15	-	-	-
	PISI	Pine Siskin	5	-	-	-
	PIWO	Pileated Woodpecker	2	-	-	-
	PSFL	Pacific-slope Flycatcher	22	-	-	-
	PUFI	Purple Finch	2	-	-	-
	PYNU	Pygmy Nuthatch	4	-	-	-
	RBNU	Red-breasted Nuthatch	1	-	-	-
	SOSP	Song Sparrow	9	-	-	-
	SPTO	Spotted Towhee	9	-	-	-
	STJA	Steller's Jay	2	-	-	-
	SWTH	Swainson's Thrush	13	-	-	-
	WAVI	Warbling Vireo	9	-	-	-
	WESJ	Western Scrub Jay	1	-	-	-
	WIWA	Wilson's Warbler	22	-	-	-
	WIWR	Winter Wren	9	-	-	-
PAG5	AMGO	American Goldfinch	1	37	11.33	15
	BEWR	Bewick's Wren	3	-	-	-
	BHCO	Brown-headed Cowbird	1	-	-	-
	BUSH	Bushtit	2	-	-	-
	CAQU	California Quail	1	-	-	-
	GCSP	Golden-crowned Sparrow	1	-	-	-
	GRSP	Grasshopper Sparrow	1	-	-	-
	NWCS	Nuttall's White-crown Sparrow	3	-	-	-
	OCWA	Orange-crowned Warbler	3	-	-	-
	RWBL	Red-winged Blackbird	5	-	-	-
	SOSP	Song Sparrow	9	-	-	-
	WCSP	White-crowned Sparrow	1	-	-	-
	WEME	Western Meadowlark	1	-	-	-
	WIWA	Wilson's Warbler	3	-	-	-
	WREN	Wrentit	2	-	-	-
PALO	ALHU	Allen's Hummingbird	15	322	22.61	34
	AMGO	American Goldfinch	14	-	-	-
	AMRO	American Robin	1	-	-	-
	ANHU	Anna's Hummingbird	7	-	-	-
	BARS	Barn Swallow	11	-	-	-
	BEWR	Bewick's Wren	13	-	-	-
	BHCO	Brown-headed Cowbird	4	-	-	-
	BHGR	Black-headed Grosbeak	1	-	-	-
	BUSH	Bushtit	2	-	-	-
	CALT	California Towhee	4	-	-	-
	CAQU	California Quail	1	-	-	-
	CBCH	Chestnut-backed Chickadee	16	-	-	-
	GCKI	Golden-crowned Kinglet	14	-	-	-
	HUVI	Hutton's Vireo	5	-	-	-
	NOFL	Northern Flicker	2	-	-	-

Appendix IV

Station	Species Code	Species Name	Count	Total Individuals	SW	Species Richness
	NWCS	Nuttall's White-crown Sparrow	10	-	-	-
	OCWA	Orange-crowned Warbler	10	-	-	-
	ORJU	Oregon Junco	7	-	-	-
	OSFL	Olive-sided Flycatcher	2	-	-	-
	PSFL	Pacific-slope Flycatcher	4	-	-	-
	PUFI	Purple Finch	11	-	-	-
	RSFL	Red-shafted Flicker	2	-	-	-
	SAVS	Savannah Sparrow	3	-	-	-
	SOSP	Song Sparrow	36	-	-	-
	SPTO	Spotted Towhee	34	-	-	-
	STJA	Steller's Jay	2	-	-	-
	SWTH	Swainson's Thrush	8	-	-	-
	TUVU	Turkey Vulture	4	-	-	-
	WAVI	Warbling Vireo	6	-	-	-
	WCSP	White-crowned Sparrow	5	-	-	-
	WESJ	Western Scrub Jay	12	-	-	-
	WIWA	Wilson's Warbler	15	-	-	-
	WIWR	Winter Wren	3	-	-	-
	WREN	Wrentit	38	-	-	-
TOMS	AMGO	American Goldfinch	29	180	7.55	13
	ANHU	Anna's Hummingbird	1	-	-	-
	BRBL	Brewer's Blackbird	11	-	-	-
	CALT	California Towhee	5	-	-	-
	CAQU	California Quail	16	-	-	-
	GRSP	Grasshopper Sparrow	1	-	-	-
	HOFI	House Finch	2	-	-	-
	NWCS	Nuttall's White-crown Sparrow	48	-	-	-
	RWBL	Red-winged Blackbird	1	-	-	-
	SAVS	Savannah Sparrow	7	-	-	-
	SOSP	Song Sparrow	42	-	-	-
	WESJ	Western Scrub Jay	10	-	-	-
	WREN	Wrentit	7	-	-	-

Appendix IV. Summary of 2002 area search efforts

Kim Cooper
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes, CA 94956

14 July 2002

RE: Bebee bird survey

The Bebee site was surveyed for breeding bird activity by the Point Reyes Bird Observatory on 12 July 2002 (see attached data form). A total of 13 species (45 individuals) were encountered on the plot during the survey.

Breeding was suspected for the Song Sparrow and the Lazuli Bunting (based on territorial behavior and my knowledge of breeding phenology). There were approximately 3 Song Sparrow territories and 2 Lazuli Bunting territories. Many of the species detected using the plot were found foraging on the large blackberry patches. Species noted eating blackberries were: Black-headed Grosbeak (adult with dependent young), European Starling, Swainson's Thrush, Song Sparrow, House Finch, and Bullock's Oriole. California Quail adults and young were observed using the large brush piles for cover.

If you have any questions please contact me at (415) 868-0655 ext. 381; tgardali@prbo.org

Tom Gardali

CC: Sarah Allen

Doug Gantt
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes, CA 94956

9 July 2002

TO: Doug Gantt

RE: Estero Trail X-mas Tree bird survey

The Estero Trail X-mas Tree site was surveyed for breeding bird activity by the Point Reyes Bird Observatory on 9 July 2002 (see attached data form). A total of 12 species (57 individuals) were encountered on the plot during the survey.

Breeding was confirmed for the American Goldfinch and suspected for Song Sparrow and Wrentit (the latter two based on territorial behavior and my knowledge of breeding phenology). See map for approximate location of goldfinch nest.

There were approximately 7 Song Sparrow territories, 4 Wrentit territories, and 10 American Goldfinch territories. Several other species were at least partially holding territories (see data form).

If it is decided that tree removal will be conducted I suggest the follow to minimize impact:

1. Avoid *any* disturbance to the low area dominated by grasses, sedges, juncus, and a mix of coyote bush.
2. Focus on cutting trees that primarily stand alone, as these are less likely used.
3. Avoid felling trees onto shrubs, blackberry, dense grasses, and mixtures of these as these are likely nesting areas.

If you have any questions please contact me at (415) 868-0655 ext. 381; tgardali@prbo.org

Tom Gardali

CC: Sarah Allen & Kim Cooper

Kim Cooper & Sarah Allen
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes, CA 94956

12 July 2002

RE: McDonald site #1 bird survey

The McDonald site was surveyed for breeding bird activity by PRBO on 12 July 2002 (see attached data form). A total of 14 species (100 individuals) were encountered on the plot during the survey.

Recent breeding was confirmed for Nuttall's White Crowned Sparrow, Song Sparrow, Grasshopper Sparrow and Bushtit (based on detections of fledglings). Current breeding was strongly suspected for Nuttall's White-crowned Sparrow, Savannah Sparrow, Grasshopper Sparrow, Song Sparrow and Swainson's Thrush (based on territorial behavior, distress calls and breeding phenology). There were approximately 10 Nuttall's White-crowned Sparrow territories, 9 Song Sparrow territories, 2 Grasshopper Sparrow territories, 7 Savannah Sparrow territories and 1 Swainson's Thrush territory.

Most bird activity was associated with dense coastal scrub in all the drainages and on the steeper slopes and cliffs along the edges of the peninsula. All grassland areas had signing Grasshopper Sparrows and Savannah Sparrows, even in the more heavily grazed locations. There was one moderately dense broom patch 10 meters from the northern edge of the site near the road where Savannah Sparrows distressed upon my approach (nests and/or fledglings were suspected but not detected). If it is decided that mowing will be conducted before the end of July, we recommend the following in order to avoid any disturbance to potentially breeding species:

1. Avoid *any* disturbance to areas dominated by scrub species such as coyote bush, poison oak, blackberry and lupine, especially where the coyote brush is growing less than 1 meter apart.
2. Avoid mowing *any* clumps of juncus, grasses, sedges and wild iris as these may still host grassland breeding species such as Grasshopper Sparrow and Savannah Sparrow.
3. Consider mowing dense broom after July 30th.

If you have any questions please feel free to contact me at (415) 868-0655 x 308, viola@prbo.org.

Viola Toniolo

Kim Cooper and Sarah Allen
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes, CA 94956

12 July 2002

RE: McDonald site #2 bird survey

The McDonald site was surveyed for breeding bird activity by PRBO on 12 July 2002 (see attached data form). A total of 13 species (126 individuals) were encountered on the plot during the survey.

Breeding was confirmed for Western Bluebird and Red-winged Blackbird (individuals were observed carrying food). Recent breeding was confirmed for American Goldfinch, Nuttall's White Crowned Sparrow, California Quail, Western Scrub-jay, Song Sparrow, and Red-winged Blackbird (based on detections of dependent fledglings). Current breeding was strongly suspected for Nuttall's White-crowned Sparrow, Savannah Sparrow, Grasshopper Sparrow, and Song Sparrow (based on territorial behavior, distress calls and breeding phenology). There were approximately 7 Nuttall's White-crowned Sparrow territories, 5 Song Sparrow territories, 6 Grasshopper Sparrow territories, and 7 Savannah Sparrow territories.

Most bird activity was associated with the riparian edge along the eastern edge of the plot and with clumps of dense coastal scrub in drainages and on steeper slopes. No bird activity was specifically associated with broom, though none of the broom patches were very dense. If it is decided that mowing will be conducted before the end of July, we recommend the following in order to avoid any disturbance to potentially breeding species:

1. Avoid *any* disturbance to areas dominated by scrub species such as coyote bush, blackberry and lupine.
2. Avoid mowing *any* clumps of juncus, grasses, sedges and wild iris as these may still host grassland breeding species such as Grasshopper Sparrow and Savannah Sparrow.

If you have any questions please feel free to contact me at (415) 868-0655 x 308, viola@prbo.org.

Viola Toniolo

Wendy Poinsett
Environmental Planner-WUI Program
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes, CA 94956

9 May 2002

TO: Wendy Poinso

RE: Panoramic Pines Bird Survey

The Panoramic Pines site was surveyed for breeding bird activity by the Point Reyes Bird Observatory on 9 May 2002 (see attached data form). A total of 17 species (25 individuals) were encountered on the plot during the survey.

Breeding was confirmed for the Wilson's Warbler, Hutton's Vireo, Pygmy Nuthatch (individuals were observed carrying food), and Anna's Hummingbird (nest material carry).

Several other species were apparently holding territories within the plot boundaries; Song Sparrow, Bushtit, Spotted Towhee, Chestnut-backed Chickadee, California Towhee, and Bewick's Wren, Allen's Hummingbird, Oregon Junco, and Pacific-slope Flycatcher.

If you have any questions please contact me at (415) 868-0655 ext. 381, tgardali@prbo.org.

Tom Gardali

CC: Daphne Hatch

Kim Cooper
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes, CA 94956

10 July 2002

TO: Kim Cooper

RE: Wilkin's Project Site bird survey

The Wilkin's Project Site was surveyed for breeding bird activity by the Point Reyes Bird Observatory on 8 and 10 July 2002 (see attached data forms). The broom polygons were numbered (see map) and the bird data corresponds directly to each polygon (i.e, number to left of the species name on the data forms). Additionally, any bird within approximately 50 m of the polygon was noted. The small patches of broom were not surveyed.

Breeding was not confirmed for any species within the proposed treatment areas. Relatively few species were detected within the proposed treatment area.

If you have any questions please contact me at (415) 868-0655 ext. 381; tgardali@prbo.org

Tom Gardali

CC: Sarah Allen

Appendix V. Summary of 2001 area search efforts

Tom Gardali
Point Reyes Bird Observatory
4990 Shoreline Highway
Stinson Beach, CA 94970

21 June 2001

TO: Ben Jacobs & Sarah Allen, Point Reyes National Seashore

RE: Comacho Bird Survey

The "Comacho" unit was surveyed for breeding bird activity by the Point Reyes Bird Observatory on 21 June 2001 (see attached data form). A total of 14 species (47 individuals) were encountered during the survey.

Breeding was confirmed for the Song Sparrow (individuals were observed carrying food to dependent young and one bird was constructing a new nest). There were approximately 6 Song Sparrow territories within the plot boundaries. Breeding was also confirmed for the Common Yellowthroat (food carries and dependent young) and there were at least 5 territories. Territories of the Song Sparrow and Common Yellowthroat were primarily located along the edge of the riparian corridor in the emergent vegetation.

Several other species were apparently holding territories in the wooded strip that runs directly along Highway One; Wrentit, Hutton's Vireo, Spotted Towhee, Chestnut-backed Chickadee, California Towhee, and Swainson's Thrush.

If you have any questions please contact me at (415) 868-0655, tgardali@prbo.org

T. Gardali

CC: Geoff Geupel

Tom Gardali
Point Reyes Bird Observatory
4990 Shoreline Highway
Stinson Beach, CA 94970

21 June 2001

TO: Ben Jacobs & Sarah Allen, Point Reyes National Seashore

RE: Rift Zone Bird Survey

The "Rift Zone" was surveyed for breeding bird activity by the Point Reyes Bird Observatory on 20 June 2001 (see attached data form). A total of 19 species (58 individuals) were encountered during the survey. Most of the birds were encountered at the northern end of the plot where patches of shrubs and trees were interspersed within the grassland.

Breeding was confirmed for the Song Sparrow (food carry) and there were 5-6 territories within the plot boundaries. There were approximately 3-4 Chipping Sparrow territories along the woodland/grassland border; their preferred nesting and foraging habitat. At least two pairs of American Goldfinches were present and habitat within the plot appeared suitable for nesting. One pair of California Towhees appeared to be holding a territory on plot and there was at least one Grasshopper Sparrow territory.

If you have any questions please contact me at (415) 868-0655, tgardali@prbo.org

T. Gardali

CC: Geoff Geupel

Tom Gardali
Point Reyes Bird Observatory
4990 Shoreline Highway
Stinson Beach, CA 94970

15 July 2001

TO: Ben Jacobs & Sarah Allen, Point Reyes National Seashore

RE: Hagmaier (plot #1) bird survey

The Hagmaier plot (#1) was surveyed for breeding bird activity by the Point Reyes Bird Observatory on 15 July 2001 (see attached data form). A total of eleven species (~40 individuals) were observed on the plot.

No evidence of current breeding activity was observed. Several lines of evidence suggested that breeding activity was over or reduced; mixed species flocks and tail feather molt.

If you have any questions please contact me at (415) 868-0655, tgardali@prbo.org

T. Gardali

CC: Geoff Geupel

Tom Gardali
Point Reyes Bird Observatory
4990 Shoreline Highway
Stinson Beach, CA 94970

3 July 2001

TO: Ben Jacobs & Sarah Allen, Point Reyes National Seashore

RE: Estero Trail bird survey (see map for specific area)

The Estero unit was surveyed for breeding bird activity by the Point Reyes Bird Observatory on 3 July 2001 (see attached data form). A total of 15 species (41 individuals) were encountered during the survey.

Breeding was confirmed for the Song Sparrow (individuals were observed carrying food to dependent young) and there were 5 - 6 Song Sparrow territories within the plot boundaries. Breeding was also confirmed for the American Goldfinch (a nest under construction was located in a coyote bush) and at least 3 pairs were present on plot. Nuttall's White-crowned Sparrows were observed carrying food on plot. California Quail were present on plot and habitat was appropriate for breeding. Most breeding activity was observed within and at edges of the lowest/wettest area (i.e., open grassy area with *juncus* sp.; see map). Minimizing impact to this area would be best.

Lone trees (i.e., those not clumped with others or other plants [e.g., blackberry]) would probably be the safest to remove first.

If you have any questions please contact me at (415) 868-0655, tgardali@prbo.org

T. Gardali

CC: Geoff Geupel

Tom Gardali
Point Reyes Bird Observatory
4990 Shoreline Highway
Stinson Beach, CA 94970

15 June 2001

TO: Ben Jacobs & Sarah Allen, Point Reyes National Seashore

RE: Tree Farm Bird Survey

The Tree Farm was surveyed for breeding bird activity by the Point Reyes Bird Observatory on 9 June 2001 (see attached data form). A total of eight species, one individual each, were encountered during the survey. No evidence of breeding was detected within the boundary of the Tree Farm during the survey.

Overall, the potential immediate impacts of a prescribed fire (in late June) on the bird community are probably minimal. Of the eight species detected, breeding habitat (coupled with behavioral observations) was only appropriate for the Grasshopper Sparrow (territory was only *partially* within the boundary of the Tree Farm) and the California Quail.

If you have any questions please contact me at (415) 868-0655, tgardali@prbo.org

T. Gardali

CC: Geoff Geupel